REMARKS

Status of Claims:

Claims 1, 3, 7, and 9 remain cancelled.

Thus, claims 2, 4-6, 8, and 10-13 are present for examination.

Claim Rejection under 35 U.S.C. 112:

Claims 4 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

With respect to claims 4 and 10, the rejection is respectfully traversed.

The Examiner states that, "[t]he term 'sufficient' in claims 4 and 10 is a relative term which renders the claim indefinite." (Office Action; page 2).

However, it is important to understand that the term "sufficient statistic" in claims 4 and 10 is a technical term that is ordinarily used in the field of statistics. Thus, a person of ordinary skill in the art would know what is meant by the term "sufficient statistic". Moreover, an example of a sufficient statistic is discussed in the specification at page 17, lines 14-22.

Therefore, claims 4 and 10 are believed to be in compliance with the requirements of 35 U.S.C. 112, second paragraph.

Claim Rejections under 35 U.S.C. 102 and 103:

Claims 2, 6, 8, 12, and 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Li et al. ("GPS Time Series Modeling by Autoregressive Moving Average Method: Application to the Crustal Deformation in Central Japan", The Society of Geomagnetism and Earth, Planetary and Space Sciences, 2000, pages 155-162) (hereinafter Li).

Claims 4 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of www.trade10.com (May 14, 2001, pages 1-3) (hereinafter Trade10).

Claims 5 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li in view of Biliris et al. (U.S. Patent No. 6,055,491) (hereinafter Biliris).

With respect to claims 2, 4-6, 8, and 10-13, the rejections are respectfully traversed.

Independent claim 2 recites an outlier and change point detection device for calculating outlier scores and change point scores for data described with a **sequentially input** discrete variate and/or continuous variate so as to allow for detection of outliers and change points of said data, said outlier and change point detection device comprising:

> "a first time-series model learning device for learning a probability distribution of the data as a time-series statistic model specified by a finite number of parameters;
>
> an outlier score calculator for reading the parameters obtained through learning by said first time-series model learning device, and for calculating an outlier score of the data based on the read parameters of the time-series statistic model and the input data, and for outputting the outlier score;
>
> a moving average calculator for **sequentially reading each outlier score** calculated by said outlier score calculator, and for calculating a moving average of the read outlier scores;
>
> a second time-series model learning device for **sequentially reading each moving average** of the read outlier scores calculated by said moving average calculator, and for learning a particular probability distribution for the read moving averages as a particular time-series statistic model specified by a finite number of particular parameters; and
>
> a change point score calculator for reading the particular parameters obtained through learning by said second time-series model learning device, and for calculating a particular outlier score for each moving average calculated by the moving average calculator based on the read particular parameters of the particular time-series model and the moving average calculated by the moving average calculator, and for outputting the particular outlier score for each moving average as a change point score of the data." (Emphasis Added).

An outlier and change point detection device including the above-quoted features for calculating outlier scores and change point scores for data described with a **sequentially input** discrete variate and/or continuous variate so as to allow for detection of outliers and change points of the data has at least the advantages that the outlier and change point detection device comprises: (i) a **first time-series model learning device** for learning a probability distribution of the data as a time-series statistic model specified by a finite number of parameters; (ii) an outlier score calculator for reading the parameters obtained through learning by the first time-series model learning device, and for calculating an outlier score of the data based on the read parameters of the time-series statistic model and the input data, and for outputting the outlier score; (iii) a moving average calculator for **sequentially reading each outlier score** calculated by the outlier score calculator, and for calculating a moving average of the read outlier scores; (iv) a **second time-series model learning device** for **sequentially reading each moving average** of the read outlier scores calculated by the moving average calculator, and for learning a particular probability distribution for the read moving averages as a particular time-series statistic model specified by a finite number of particular parameters; and (v) a change point score calculator for reading the particular parameters obtained through learning by the second time-series model learning device, and for calculating a particular outlier score for each moving average calculated by the moving average calculator based on the read particular parameters of the particular time-series model and the moving average calculated by the moving average calculator, and for outputting the particular outlier score for each moving average as a change point score of the data.

Li neither discloses nor suggests an outlier and change point detection device including the above-quoted features.

In Li, an outlier score of data and change points are detected by using an Autoregressive Moving Average (**ARMA**) model. (Li; p. 155). For instance, in Li, change points are deterministically detected by checking whether a residual is larger than its expected square value by two times. (Li; p. 156).

In contrast, an outlier and change point detection device of the present claim allows for computing a change point score in real-time, i.e., every time the data is input. Such a

change point score is a score obtained by calculating quantitatively how likely each point is to be a change point (degree of change point-likeness), which cannot be calculated using the method in the Li reference.

Moreover, an outlier and change point detection device of the present claim allows for computing a change point score in real-time by means of a **2-stage learning technique** of learning original time series and then learning a time series obtained by the prediction loss again. This makes the change-point analysis very robust to noise. In contrast, since the method disclosed in the Li reference **does not employ such a 2-stage learning technique**, the change points detected by Li tend to be very sensitive to noise.

Therefore, independent claim 2 is neither disclosed nor suggested by the Li reference and, hence, is believed to be allowable.

Independent claim 8 recites an outlier and change point detection method with features similar to features of an outlier and change point detection device of independent claim 2 and, thus, is believed to be allowable for at least the same reasons that independent claim 2 is believed to be allowable.

Independent claim 13 recites a device with features similar to features of an outlier and change point detection device of independent claim 2 and, thus, is believed to be allowable for at least the same reasons that independent claim 2 is believed to be allowable.

The dependent claims are deemed allowable for at least the same reasons indicated above with regard to the independent claims from which they depend. With respect to dependent claims 4 and 10, it is noted that Trade10 does not cure the deficiencies with regard to the teaching of Li discussed above. Thus, the Patent Office has not made out a *prima facie* case of obviousness under 35 U.S.C. 103. With respect to dependent claims 5 and 11, it is noted that Biliris does not cure the deficiencies with regard to the teaching of Li discussed above. Thus, the Patent Office has not made out a *prima facie* case of obviousness under 35 U.S.C. 103.

Conclusion:

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

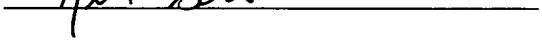
The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 50-0872. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 50-0872.

If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 50-0872.

Respectfully submitted,

Date October 19, 2006

By 

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (310) 975-7965
Facsimile: (310) 557-8475

Justin M. Sobaje
Attorney for Applicant
Registration No. 56,252